

apteryc. At present it is impossible to answer this question, because the fossils that we possess are destitute of their integuments, and it is very difficult to say *à priori* with what cutaneous structures these creatures were covered. There is complete homology between the scales or the spines of reptiles on the one hand, and the feathers of birds on the other. The reptilian structures differ in no respect from the wart-like stumps which appear in the embryo bird as the first traces of plumage; the feather of the bird is only a reptile's scale further developed; and the reptile's scale is only a feather which has remained in the embryonic condition. There can consequently be no doubt that the feathers of *Archæopteryx*, which are so perfectly developed, must have been preceded in other preexisting reptiles by cutaneous structures representing in a persistent fashion the different stages of the embryonic development of the feather. We must therefore imagine the ancestors of the *Archæopteryx* as lizard-like terrestrial reptiles, having feet with five, hooked, free digits, showing no modification in their skeleton, but having the skin furnished at different points with elongated warts, downy plumes, and rudimentary feathers, not yet fitted for flight, but susceptible of further development in the course of generations.—*Bibliothèque Universelle, Archives des Sciences*, December 15, 1879, pp. 702-708.

Note on the Genus Brahmæa of Walker.

By ARTHUR G. BUTLER, F.L.S., F.Z.S., &c.

The first figure of a species in this genus is that by Petiver (Gazoph. tab. 18. fig. 3), a perfectly recognizable illustration of a species recorded as coming from the island of Chusan, and, as I have noted (P. Z. S. 1866, p. 458), identical with *B. lunulata* and *undulata* of Bremer, a good figure of which is given in Ménétriés's Catalogue of the Lepidoptera in the St.-Petersburg Museum (pt. iii. pl. 15. fig. 5).

The first description of an Oriental species is that of *B. certhia* given by Fabricius in the 'Entomologia Systematica,' iii. 1, p. 412. n. 16 (1797); and as this description does not seem to have been looked at by living Lepidopterists, at any rate in recent years, it will perhaps astonish them not a little if I quote it verbatim:—

"*Certhia*. 16. B. alis patulis rotundatis fuscis apice cinereo albo fuscoque undatis.

"Petiv. Gazoph. tab. 18. fig. 3.

"Habitat in Chusan. Mus. Brit.

"Magna. Corpus fuscum collari abdominisque lateribus cinereis. Alæ omnes concolores, basi fusca, apice cinerea, albo fuscoque undata."

Therefore there cannot be a question that the *B. lunulata* (and *undulata*) of Bremer is the typical *B. certhia* of Fabricius. The *B. certhia* of Walker, figured by myself (P. Z. S. 1866, p. 119, fig. 1), may consequently be named *B. conchifera*, on account of the beautifully shaded shell-like submarginal spots upon the wings.

Another point in the synonymy of this genus has also been cleared up through the transfer of the types of Lepidoptera in the India Museum. Among these we received a Nepal species bearing the type-labels of *B. Wallichii*, Gray, and *B. spectabilis*, Hope, and agreeing perfectly with both descriptions and the figure. The specimen is from the collection of General Hardwicke, as stated by Hope, and differs strikingly, both in coloration and pattern, on both surfaces from the better-known *B. conchifera* of Darjeeling and Silhet.

The true *B. certhia* of Fabricius, which 83 years ago was quoted as in the British Museum, is now also not to be found.

Two examples of *B. Wallichii* in Mr. Dana's collection agree in all important characters with the type.

New Classification of the Crustacea.

By A. S. PACKARD, JUN.

The recent studies on the embryology of the king crab (*Limulus polyphemus*) have shown that there are some unexpected resemblances to the mode of development of the Arachnida; and while in our essay* on the development of this crustacean we attempted to show that the arachnidan features were also to be found in certain crabs and shrimps whose development was exceptional, one or two naturalists (as E. Van Beneden and Dohrn) claim that *Limulus* is not a true crustacean, but belongs next to or with the Arachnida. This seems to us an extreme view. Then followed the beautiful anatomical researches of Alphonse Milne-Edwards on *Limulus polyphemus*, in which he showed the singular relation between the vascular and nervous systems, the latter being enveloped by the ventral system of the arteries. The differences between the nervous system of the king crab and Arachnida has been already indicated †. It has not been, we think, sufficiently taken into account that *Limulus* is a generalized or synthetic type, combining with features of its own certain resemblances to the Arachnida and to the normal Crustacea. In its mode of respiration, its external gills, and in its circulatory organs it is, as we have previously stated ‡, essentially a crustacean, but should be placed apart from the normal Crustacea, and form the living representative of a subclass, equivalent to all the other living Crustacea. To *Limulus* are closely allied the fossil Merostomata; and we regard, for reasons already stated, the Trilobites as closely allied to the Merostomata.

For this subclass we have proposed the name Pakæocarida; and for the normal Crustacea we have proposed the term Neocarida.

* "The Development of *Limulus polyphemus*," by A. S. Packard, Jun. (Memoirs of the Boston Soc. of Nat. Hist., published March 1872).

† "American Naturalist," vol. ix. pp. 422, 423, July 1875.

‡ "Further Observations on the Embryology of *Limulus*, with notes on its Affinities," American Naturalist, Nov. 1873, vol. vii. p. 675.